

REMARKS

Claims 1 and 2 have been objected to because of various informalities.

Claims 1-3, 5, 9, 12, 13, and 15-18 have been rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 6,066,861 (“Hohn”).

Claims 4 and 14 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Hohn in view of U.S. Patent Pub No. 2005/0208789 (“Shirai”).

Claims 6-8, 10, and 11 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Hohn.

Claim 19 has been rejected under 35 U.S.C. §103(a) as being unpatentable over Hohn in view of U.S. Patent No. 6,093,584 (“Fjelstad”).

Status of the claims

Claims 1 and 3-14 have been amended.

Claim 2 has been canceled.

Claims 1 and 3-19 are now pending.

Objection to claims 1 and 2

The Office Action states that the term “it” is unclear. Claims 1 and 2 have been amended to replace the word “it” with the correct proper noun. Applicants submit that this objection has now been overcome.

Summary of Subject Matter Disclosed in the Specification

The following descriptive details are based on the specification. They are provided only for the convenience of the Examiner as part of the discussion presented herein, and are not intended to argue limitations which are unclaimed.

The specification discloses a surface-mountable miniature luminescent diode or photodiode that includes a chip package which has a leadframe (16), and a semiconductor chip (22) which is arranged on, and is in electrical contact with, the leadframe (16). The semiconductor chip contains an active, radiation-emitting and/or radiation-receiving region. The leadframe (16) is formed by a flexible multi-layered sheet that comprises a metal foil (12) and a plastic film (14). The plastic film (14) is arranged on, and connected to, the metal foil (12).

Descriptive summary of Hohn

Hohn discloses a light-emitting semiconductor component. The semiconductor component includes a semiconductor body (1) that is secured by a back-side contact (11) to a first electrical terminal (2) by means of an electrically conductive joining means such as a metal solder or an adhesive. A front-side contact (12) is joined to a second electrical terminal (3) by means of a bond wire (14) (see Fig. 1; and col. 7, line 65 to col. 8, line 6 of Hohn). The free surfaces of the semiconductor body (1) and portions of the electrical terminals (2) and (3) are enclosed directly by a hardened, wavelength-converting casting or potting composition (5).

Hohn further discloses that the first and second electrical terminals (2, 3) are embedded in an opaque, and optionally prefabricated, basic housing (8) that has a recess (9) (see Fig. 3; and col. 8, lines 35-39). The prefabricated housing (8) is already finished at the terminals (2, 3), for example, by means of injection molding, before the semiconductor body is mounted on the

terminal (2) (col. 8, lines 40-43). The basic housing (8) is formed of opaque plastic, and in terms of its form the recess (9) is embodied as a reflector (17) for the radiation emitted by the semiconductor body in operation (the reflection optionally being achieved by means of suitable coating of the inside walls of the recess 9) (col. 8, lines 43-49). Such basic housings (8) are used in particular for LEDs that are surface-mounted on printed circuit boards. They are applied, before mounting of the semiconductor body, to a conductor strip (lead frame) that has the electrical terminals (2, 3), the application for instance being done by injection molding (see Fig. 3, and col. 8, lines 49-54).

Claims 1-3, 5, 9, 12, 13 and 15-18 are allowable over Hohn under 35 U.S.C. §102(b)

The Office Action states that Hohn teaches all of Applicants' recited elements.

Independent claim 1 has been amended to add the limitation "wherein the leadframe is formed by a flexible multi-layered sheet that comprises a metal foil and a plastic film, the plastic film being arranged on, and connected to, the metal foil". Support for the claim amendment can be found, at least, in original claim 2.

Hohn fails to teach or suggest "wherein the leadframe is formed by a flexible multi-layered sheet that comprises a metal foil and a plastic film, the plastic film being arranged on, and connected to, the metal foil", as recited in Applicants' amended independent claim 1, because Hohn fails to disclose (1) a flexible multilayered sheet and (2) a sheet having a metal foil and a plastic film.

With respect to the subject matter of claim 2, which has been incorporated into now amended claim 1, the Examiner cites the housing (8) of Hohn as being a plastic film. Applicants submit that Hohn has been misinterpreted.

Although the housing (8) disclosed by Hohn may be made of plastic, it is not a plastic film. In particular, as described above, and in col. 8, lines 36-54 of Hohn discloses that the housing (8) is a prefabricated housing applied to the leadframe by injection molding. A person skilled in the art would not consider a prefabricated housing made by injection molding as a "plastic film". The housing (8) of Hohn has a recess (9) with oblique sidewalls that form a reflector (17) for the chip. Therefore, the housing (8) is clearly not a plastic film, as recited in Applicants' amended independent claim 1.

The Examiner cites the electrical terminals (2, 3) of Hohn as being the multilayered sheet recited in Applicants' claims. However, Hohn fails to teach or suggest that the alleged multilayered sheet (i.e. the leadframe 2, 3) and the housing (8) are flexible, as recited in Applicants' amended independent claim 1. It would make no sense to assume that the injection-molded housing (8) of Hohn is flexible because the housing (8) has a three dimensional structure that forms a reflector (17).

Further, Hohn also fails to teach or suggest that housing (8) is arranged on the metal foil, as recited in Applicants' amended independent claim 1. In contrast, Hohn teaches that the housing (8) encloses the electrical terminals (2, 3).

The purpose of Applicants' invention to provide an LED package that has a reduced height, as described in paragraphs [0002] and [0003] of Applicants' published specification. This is achieved by applying a thin plastic film on a metal foil. In contrast, the injection-molded housing (8) disclosed by Hohn includes a portion that encloses the electrical terminals (2, 3), a portion below the electrical terminals (2, 3), and a portion above the electrical terminals (2, 3), which contribute to the overall height of the device.

In view of the foregoing, it is respectfully submitted that Hohn fails to teach or suggest the subject matter recited in Applicants' amended independent claim 1. Accordingly, claim 1 is patentable over Hohn under 35 U.S.C. §102(b).

Claim 12 has been amended to recite limitations similar to claim 1 and is, therefore, deemed to be patentably distinct over Hohn for at least those reasons discussed above with respect to independent claim 1.

Dependent claims

Claims 2-3, 5, 9, 13 and 15-18, which depend directly or indirectly from amended independent claims 1 and 12, incorporate all of the limitations of the corresponding independent claim and are, therefore, deemed to be patentably distinct over Hohn for at least those reasons discussed above with respect to independent claims 1 and 12.

With respect to claim 3, the Examiner argues that the housing (8) of Hohn is adhesively bonded to the electrical terminals (2, 3). Applicants' submit that Hohn has been misinterpreted. As previously discussed, the housing (8) of Hohn is formed around the electrical terminals (2, 3) by injection molding and, thus, does not teach or suggest that "the plastic film is adhesively bonded to the metal foil", as recited in Applicants' claim 3.

Claim 5 depends from claim 4, which is not anticipated by Hohn. Therefore, the 102(b) rejection of claim 5 is improper.

With respect to claim 13, the Examiner argues that Hohn discloses the method step of punching a metal foil. Hohn neither discloses that the electrical terminals (2, 3) are made from a metal foil nor does Hohn disclose that the foil is punched. Therefore, Hohn fails to teach or suggest the subject matter of Applicants' claim 13.

With respect to claim 15, the Examiner argues that Hohn discloses the method step of adhesive bonding a metal foil and a plastic film. Hohn teaches that the housing (8) is formed around the electrical terminals (2, 3) by injection molding. Therefore, Hohn fails to teach or suggest the subject matter of Applicants' claim 15.

With respect to claim 17, the Examiner cites col. 10, lines 7-12 and col. 8, lines 49-54 of Hohn as teaching "in the encapsulating step, a runner is led through a plurality of chips arranged on the multi-layered sheet". The cited passages of Hohn fail to teach or suggest that in the encapsulation step a runner is led through a plurality of chips on the multi-layered sheet (i.e., that a plurality of chips is encapsulated in a single process step), as recited in Applicants' claim 17.

With respect to claim 18, the Examiner argues that Fig. 3 of Hohn discloses that the chips are short-circuited and grounded during the step of mounting the semiconductor chip. However, nothing in Fig. 3 or the corresponding detailed description of Hohn supports the Examiner's argument.

Claims 4 and 14 are allowable over Hohn and Shirai under 35 U.S.C. §103(a)

The Office Action states that the combination of Hohn and Shirai teaches all of Applicants' recited elements.

Applicants' priority date is June 26, 2002 and the U.S. filing date of the resent application is June 4, 2003. The effective filing date of Shirai is March 4, 2004. Therefore, Applicants' invention antedates Shirai and Shirai is an improper reference.

Claims 6-8, 10, and 11 are allowable over Hohn under 35 U.S.C. §103(a)

The Office Action states that Hohn teaches all of Applicants' recited elements.

As previously discussed, Hohn does not teach or suggest the subject matter recited in Applicants' amended independent claim 1.

Claims 6-8, 10, and 11, which depend directly or indirectly from amended independent claim 1, incorporate all of the limitations of independent claim 1 and are therefore deemed to be patentably distinct over Hohn for at least those reasons discussed above with respect to independent claim 1.

With respect to claim 8, the Examiner argues that it would be obvious to a person skilled in the art to use a plastic film with a thickness of only 80 μm or less in the device disclosed by Hohn. Applicants submit that it would not be obvious to one skilled in the art to use a plastic film with a thickness of only 80 μm or less in the device disclosed by Hohn because such a small thickness would not be enough to form the reflector (17) around the chip of Hohn.

Claim 19 is allowable over Hohn and Fjelstad under 35 U.S.C. §103(a)

The Office Action states that the combination of Hohn and Fjelstad teaches all of Applicants' recited elements.

As previously discussed, Hohn does not teach or suggest the subject matter recited in Applicants' amended independent claim 12.

Because Hohn does not teach or suggest the subject matter recited in independent claim 12, and because Fjelstad does not teach or suggest the elements of claim 12 that Hohn is missing, the addition of Fjelstad to the reference combination does not remedy the non-obviousness of the claim.

Claim 19, which depends directly from amended independent claim 12, incorporates all of the limitations of independent claim 12 and is therefore deemed to be patentably distinct over

Hohn and Fjelstad for at least those reasons discussed above with respect to independent claim 12.

Conclusion


In view of the foregoing, reconsideration and withdrawal of all rejections, and allowance of all pending claims is respectfully solicited.

Should the Examiner have any comments, questions, suggestions, or objections, the Examiner is respectfully requested to telephone the undersigned in order to facilitate reaching a resolution of any outstanding issues.

It is believed that no fees or charges are currently due. However, if any fees or charges are required at this time in connection with the application, they may be charged to our Patent and Trademark Office Deposit Account No. 03-2412.

Respectfully submitted,

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